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## Setting Standards for High Definition Television: Federal Policy Must Promote More Than Just a Better Picture

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# Setting Standards for High Definition Television: Federal Policy Must Promote More Than Just a Better Picture

GEORGE SNYDER, JR.\*

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## I. INTRODUCTION

High Definition Television (HDTV) is a major step in the technological advancement of television.<sup>1</sup> Conventional television will give way to HDTV in the next decade because HDTV delivers a clearer picture and better sound than its forerunner. HDTV will provide twice the picture resolution of conventional television and unlike today's television, HDTV will look better on a larger screen, with picture quality similar to that of a 35mm motion picture.<sup>2</sup> HDTV's audio quality will be equal to that of a compact disc. The superior performance of HDTV will dramatically improve the quality of home entertainment systems, but HDTV represents far more than just better television.

HDTV will benefit information systems in general. Its potential to merge with computer technology will have a profound effect on graphics displays used in medical diagnosis, engineering design and manufacturing, and office communications. Higher resolution displays will also have various military applications, including intelligence imaging, high fidelity simulation displays, and command center displays. The demand for advanced television systems will not be limited to household consumers.

The potentially broad market for HDTV products indicates that a competitive domestic HDTV industry would benefit the United States in a variety of ways. In the United States, however, governmental intervention into the marketplace and cooperative ventures have traditionally been disfavored.<sup>3</sup> Japanese and European firms, which rely heavily on

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1. "HDTV" is one of several acronyms used in connection with video technologies. Other acronyms that will be important to the reader are "ATV", which stands for Advanced Television; "EDTV", which stands for Enhanced Definition Television; "VCR", which stands for Video Cassette Recorder; and "the NTIA", which stands for the National Telecommunications and Information Administration, a branch of the Department of Commerce.

ATV is a generic and broad term for any system that improves television quality. HDTV and EDTV are subsets of ATV; HDTV represents a completely new approach to television, while EDTV is the product of efforts to improve existing systems. The terms ATV and HDTV are often used interchangeably by various sources, and for purposes of this article the distinction between them is generally not important. See *In re Advanced Television Systems and Their Impact on the Existing Television Broadcast Service*, 3 F.C.C.R. 6520, 6544 n.1 (1988) (Tentative Decision and Further Notice of Inquiry) [hereinafter Further Notice].

2. HDTV images have resolution and an aspect ratio very similar to those of motion picture images. Aspect ratio is the ratio of the image's width to its height. Most proposed HDTV systems are designed to provide an aspect ratio of 16:9 rather than the 4:3 ratio of conventional television, thus giving HDTV the wide screen appearance of a motion picture. See K. BLAIR BENSON & DONALD G. FINK, *HDTV: ADVANCED TELEVISION FOR THE 1990s* 1.1 to 1.2 (1991).

3. Disfavor of governmental intervention into private market activities, or "laissez-faire," has been a guiding principle behind U.S. economic policy, particularly with regard to international trade, since the end of World War II. Just after World War II, the United States was the world's premier military and economic power, and thus it was willing and able to push for more open and

government sponsorship and teamwork, have moved ahead of U.S. firms in the race to develop and market advanced television products.<sup>4</sup> Despite the changing nature of the world economy in which countries, rather than companies, often compete against one another, U.S. policy has remained the same.<sup>5</sup> In order for U.S. firms to enter the HDTV market, they must assume much of the risk themselves.

Nevertheless, there is one area in which the federal government will play a role in the nurturing of a domestic HDTV industry: the selection of technical standards which will govern HDTV production and transmission.<sup>6</sup> Standards will influence U.S. involvement in the HDTV indus-

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restraint-free global trade to maximize its commercial advantages in capital, raw materials, and finished goods and services. Although America's global commercial power was declining during the 1980s, the Reagan administration continued to embrace the tradition of laissez-faire in the face of a changing world economy, and the principle remains prevalent today. See ROBERT KUTTNER, *THE END OF LAISSEZ-FAIRE: NATIONAL PURPOSE AND THE GLOBAL ECONOMY AFTER THE COLD WAR* 6-7 (1991).

Suspicion toward cooperative ventures is an element of antitrust sentiment, a prevalent shaper of American economic policy and legislation during the past century. Federal antitrust policy is rooted in the Sherman Act of 1890, and has evolved into a complex web of laws that some believe has stifled innovation and damaged America's ability to compete internationally. See generally ROBERT H. BORK, *THE ANTITRUST PARADOX* (1978). See also Paul Magnusson, *The Antitrust Ball and Chain Hobbling High Tech*, BUS. WK., July 29, 1991, at 34.

4. In Japan, development of HDTV was begun in the early 1970s by Japan's government-sponsored national broadcasting company, Nippon Hoso Kyokai (NHK). NHK has transferred its HDTV technology, free of charge, to private sector firms. These firms have been and are currently converting this technology into commercial products. A working HDTV system was first demonstrated in 1981, and today NHK provides satellite transmission of HDTV on a limited basis. See NTIA, *Advanced Television, Related Technologies, and the National Interest* 20-21 (Mar. 1989) [hereinafter *ATV and the National Interest*], reprinted in *High Definition Television: Hearing Before the House Comm. on Science, Space, and Technology*, 101st Cong., 1st Sess. 49-89 (1989) [hereinafter *HDTV Hearing*]. See also Hugh C. Donahue, *Choosing the TV of the Future*, TECH. REV., Apr. 1989, at 30, 32.

Coordinated European efforts to develop HDTV began in 1985, when major manufacturers including Philips (The Netherlands) and Thomson (France) first teamed up. In 1986, the European Community funded an HDTV research and development consortium called "Eureka '95". See *ATV and the National Interest*, *supra*, at 21-23; see also *infra* note 44.

5. See 135 CONG. REC. H1816 (daily ed. May 10, 1989) (statement of Rep. Lipinski); see generally JOHN M. CULBERTSON, *THE TRADE THREAT AND U.S. TRADE POLICY* (1989).

6. Technical standards are rules and conventions that must be adhered to by those who produce HDTV equipment and programming in order to make HDTV feasible as a mass medium. An example of a technical standard is the use of 35 mm film throughout the film industry. Certain key physical parameters must be kept constant to ensure compatibility among equipment which creates HDTV programming, equipment which delivers HDTV programming, and equipment which receives and displays HDTV programming. By maintaining consistency in such characteristics as picture shape and the frequency with which pictures are redrawn, technical standards ensure that HDTV signals are fundamentally similar and can be received and processed by equipment designed in accordance with those standards. For examples of production and transmission standards, see *infra* parts IV, V.

try and affect mass media competition in this country as the inevitable conversion to the new technology occurs. The issue of standards has both domestic and international ramifications. The goal of this Comment is to expose the importance of HDTV to U.S. interests, and to examine what standards policy the federal government should adopt in light of those interests. First, the need for a successful domestic HDTV industry is underscored by a discussion of the economic and military benefits that such an industry may provide. This is followed by recognition of the isolated and primary role standards will play in the development of a domestic HDTV industry, given the federal government's reluctance to facilitate development by means which are more direct than merely choosing standards. Once this foundation has been laid, the issues and options surrounding the selection of standards will be analyzed with regard to the two general types of technical standards: production standards and transmission standards.

## II. THE IMPORTANCE OF HDTV TO THE UNITED STATES

HDTV and related technologies have garnered the attention of federal policy makers because these technologies represent an opportunity for the United States to improve its global economic competitiveness in the coming decades. Policy makers are also concerned that if the United States does not foster a strong HDTV industry, critical defense applications of HDTV technologies will depend on foreign know-how. Beneath the economic and military concerns lies a more fundamental reason for the recent Congressional and administrative interest in HDTV:<sup>7</sup> the United States is no longer alone at the forefront of high technology development. On a basic level, HDTV has come to symbolize a proving ground for this country's spirit of innovation.

### A. *Market Forecasts and Economic Benefits*

A primary reason HDTV has become the focus of policy debates is that it has been portrayed as a potential spark for the U.S. economy. With the exception of Zenith Electronics Corporation, U.S. firms have abandoned the consumer electronics industry, causing manufacturing jobs to disappear and the trade deficit to escalate.<sup>8</sup> HDTV may offer an

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7. See *infra* part III.

8. While the U.S. market for consumer electronics items such as radios, televisions, and video cassette recorders has been growing steadily, the share of that expanding market controlled by domestic firms had decreased from close to 100 percent in the early 1950s to about 5 percent by the late 1980s. See MICHAEL L. DERTOUZOS ET AL., MASSACHUSETTS INSTITUTE OF TECHNOLOGY

opportunity for the United States to re-enter the international consumer electronics industry and market, provided that policy decisions — including those involving standards — are wisely made. While the economic significance of HDTV in the coming years is difficult to predict, it is clear that even limited domestic HDTV production will create new jobs and help lower the trade deficit.

In assessing the potential impact of HDTV on the U.S. economy, the first task is to define the scope of the HDTV industry. Because the results of an economic forecast depend largely on what is included under the title "HDTV industry," arguments for both broad and narrow interpretations have been at the core of the economic impact debate. Various groups have studied the economic prospects for HDTV, and four major reports produced in 1988 and 1989 examine the future role of the HDTV industry in our economy. The first of these reports was prepared for the National Telecommunications and Information Administration (NTIA), a branch of the Department of Commerce, by Darby Associates of Washington, D.C.<sup>9</sup> The second report was written by a team from the American Electronics Association.<sup>10</sup> Also, the Electronic Industries Association commissioned a study by Robert R. Nathan Associates.<sup>11</sup> Finally, the Congressional Budget Office issued its own report, which was chiefly an evaluation of the previous three studies.<sup>12</sup> The studies analyzed market size and the effects U.S. market-share will have on such areas as domestic employment and the trade deficit.

The market forecasts made in each of the reports predict that the value of HDTV sales will grow steadily during the next two decades. By the year 2010, the U.S. market value for HDTV receivers and VCRs will likely reach the \$10 billion mark, and may even surpass that figure by a

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COMM'N ON INDUSTRIAL PRODUCTIVITY, MADE IN AMERICA: REGAINING THE PRODUCTIVE EDGE 217-30 (1989).

9. Larry F. Darby, *Economic Potential of Advanced Television Products* (Apr. 1988) (prepared for the NTIA) [hereinafter NTIA Report], reprinted in *Prospects for Development of a U.S. HDTV Industry: Hearing Before the Senate Comm. on Governmental Affairs*, 101st Cong., 1st Sess. 433-91 (1989) [hereinafter *Prospects for Development*].

10. American Electronics Association, *High Definition Television (HDTV): Economic Analysis of Impact* (Nov. 1988) [hereinafter AEA Report], reprinted in *Prospects for Development*, supra note 9, at 300-39.

11. Robert R. Nathan Associates, *Television Manufacturing in the United States: Economic Contributions—Past, Present, and Future* (Feb. 1989) (prepared for the Electronic Industries Association) [hereinafter EIA Report], reprinted in *Prospects for Development*, supra note 9, at 340-432.

12. Congressional Budget Office, *The Scope of the High-Definition Television Market and Its Implications for Competitiveness* (unpublished staff working papers, 1989) [hereinafter CBO Report], in *Prospects for Development*, supra note 9, at 61-94.

significant amount.<sup>13</sup> "The potential impact on national income and pressure on domestic employment of this level and value of realized U.S. household consumer expenditure may reasonably be expected to be substantial."<sup>14</sup> Furthermore, the world market for HDTV receivers and VCRs could reach \$40 billion by the year 2010.<sup>15</sup> Such a large demand will also stimulate the market for semiconductors and other components used in HDTVs, so that the consequences of U.S. participation could be enormous; many jobs and our balance of trade are at stake.

1. *Employment Effects.* The extent to which HDTV will create new jobs is dependent on market growth, and thus there is reason to believe that employment effects will be considerable. The NTIA analysis sets the potential number of jobs directly created by domestic HDTV manufacturing at 35,000 by 1998, with another 65,000 jobs created indirectly through HDTV's influence on related industries.<sup>16</sup> The Electronics Industries Association report projects the total number of HDTV-related jobs will reach 128,000 by the year 2003.<sup>17</sup> Furthermore, the

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13. The NTIA report presents two scenarios: one rapid growth and the other slow growth. The rapid growth scenario envisions a domestic annual market value of \$21.6 billion by the year 2008, with annual sales reaching 18 million units for HDTV receivers and 11 million units for HDTV-compatible VCRs, while the slow growth scenario places the total market value at \$10.8 billion that same year. The dollar figures quoted are assumed to be in 1988 dollars, as no inflation rate was provided in the report. See NTIA Report, *supra* note 9, at 29-38.

The American Electronics Association report forecasts an annual market value of \$10.8 billion by the year 2010, with 11 million HDTV receivers and 9 million HDTV-compatible VCRs being sold in the United States. Once again, dollar figures are assumed to be in 1988 dollars. See AEA Report, *supra* note 10, tables 1 through 4 and accompanying text.

The Electronic Industries Association study places the domestic market value at \$11.8 billion by the year 2003, based solely on sales of HDTV receivers, which it forecasts will reach 13 million units that same year. The dollar figure taken from the EIA report has been discounted to 1988 dollars using a 3.5 percent annual rate of inflation. See EIA Report, *supra* note 11, table IV-3 and accompanying text.

14. *ATV and the National Interest*, *supra* note 4, at 12.

15. The American Electronics Association predicts \$18 billion in HDTV receiver sales and over \$22 billion in HDTV VCR sales worldwide. AEA Report, *supra* note 10, tables 2, 3 and accompanying text.

16. The estimate of directly related jobs is based on the value added to sales of consumer electronics by one worker; in 1983, for every \$27,000 worth of consumer electronics goods valued by U.S. consumers, one person was employed. The NTIA study projects the total direct value added through HDTV sales will be \$960 million in 1998, which would create about 35,000 jobs. The total number of jobs created, both directly and indirectly, was estimated by multiplying the number of direct jobs by a factor representative of the secondary income and employment effects derived from direct value added. See NTIA Report, *supra* note 9, at 42-43 (using multiplier method from ARTHUR D. LITTLE, CONSUMER ELECTRONICS: A \$40 BILLION AMERICAN INDUSTRY (1985)).

17. The Electronic Industries Association projection is based on a value-added-to-jobs ratio similar to the method used in the NTIA report. See EIA Report, *supra* note 11, at 65-73. The Elec-

number of jobs created is not of sole importance; the type of jobs created is also economically significant. New opportunities will be centered around high technology, whether they involve research and development of new equipment or servicing the same. "[I]t is expected that many of the jobs linked to ATV will be not only challenging and rewarding, but that they will also encourage the development and maintenance of skills vital to future U.S. competitiveness throughout the economy."<sup>18</sup> Employment estimates depend on a great many variables and assumptions, including a high level of U.S. HDTV production; federal standards will help determine participation by American companies and will thereby influence the actual employment effects realized from HDTV.

2. *Trade Balance Effects.* In addition to the employment benefits, a thriving HDTV industry may decrease the U.S. trade deficit. Forecasts of a large U.S. market for HDTV receivers and related equipment<sup>19</sup> underscore the importance of a domestic HDTV industry to our trade deficit: if U.S. firms do not enter their home market, consumers will be forced to buy HDTV items from the Japanese and others, thus contributing further to the current imbalance.<sup>20</sup> Improving our trade balance by increasing U.S. productive performance is vital to maintaining the overall high standard of living in this country.<sup>21</sup> The Economic Policy Institute has concluded that weak U.S. participation in the HDTV market could result in a staggering \$227 billion trade deficit in related electronics industries by the year 2010.<sup>22</sup> However, after its analysis of the three

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tronic Industries Association report asserts that there will be no net employment impact from the introduction of HDTV into the U.S. market because "[c]ompensating differences in [volume of production, product mix, and sources of inputs] suggest that HDTV will have no net employment impact on the [TV] pipeline." *Id.* at 70. However, the manufacturing jobs at the source of the TV pipeline are currently located outside of the United States, with only distribution jobs located here. HDTV has the potential to relocate valuable manufacturing jobs into the United States and shift the emphasis of distribution from an import-based posture to an export-based posture, provided that government policy shifts toward a more active role. The fact that the Electronic Industries Association is made up of foreign firms may explain the Electronic Industries Association's willingness to understate the employment prospects of HDTV.

18. *ATV and the National Interest*, *supra* note 4, at 14.

19. *See supra* note 13.

20. According to figures released by the Electronic Industries Association, the U.S. trade deficit in consumer electronics was \$2.4 billion for the first three quarters of 1991. *Christmas Came Late and With Little Profit*, COMM. DAILY, Dec. 31, 1991, at 5, available in LEXIS, Fedcom Library, Comdly File.

21. DERTOUZOS, *supra* note 8, at 33-35.

22. The industries are HDTV receivers and VCRs, personal computers, semiconductors, and automated manufacturing equipment. *See* Robert Cohen, *The Consequences of Failing to Develop a Strong HDTV Industry in the United States* (Economic Policy Institute Briefing Paper, Washington,



market forecasts discussed above, the Congressional Budget Office downplayed the impact HDTV would have on U.S. competitiveness by concluding that "it is unlikely that HDTV will by itself revitalize the U.S. electronics sector."<sup>23</sup> The Congressional Budget Office report was heavily criticized, though, for taking a narrow view of the HDTV industry.<sup>24</sup> The report prepared for the NTIA concluded that

home video products are a major source of the deficit and, consequently, a line of business where some potentially remedial steps might generate substantial payoffs. That is the good news. The bad news is that the trade account could be dramatically worsened if US households do not have a domestic option for ATV products and instead satisfy their entire demand for these products from sources abroad.<sup>25</sup>

The value of HDTV to strong free-trade and U.S. competitiveness will become evident in the coming years, a fact that has not escaped notice by our competitors.<sup>26</sup>

The economic ramifications of U.S. participation in the HDTV industry should not be ignored. Even in the most pessimistic scenario, the HDTV industry is worth fostering and should not be hindered by poor selection of technical standards. The domestic and world markets for HDTV products will be large, and failure by U.S. firms to gain a significant share of these markets will mean at best a greater degree of underemployment, and at worst a higher level of unemployment. If U.S. consumers are forced to purchase foreign-made equipment, the United

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D.C.), reprinted in 135 CONG. REC. S3481-82 (daily ed. Apr. 6, 1989) (statement of Sen. Heinz). The inter-relatedness of these industries will act to compound the losses due to non-participation. See PUBLIC POLICY IMPLICATIONS OF ADVANCED TELEVISION SYSTEMS: A STAFF REPORT PREPARED FOR THE USE OF THE SUBCOMM. ON TELECOMMUNICATIONS AND FINANCE OF THE HOUSE COMM. ON ENERGY AND COMMERCE, 101st Cong., 1st Sess. 34 (1989) [hereinafter PUBLIC POLICY IMPLICATIONS] (American Electronics Association response to request for HDTV action memoranda).

23. CBO Report, *supra* note 12, at 28.

24. Critics included the American Electronics Association, which called the Congressional Budget Office report a "narrow academic exercise" that "ignores a plethora of data which points to HDTV as a driver technology and fails to ascertain the true dimensions of the international electronics industry." *Prospects for Development*, *supra* note 9, at 103 (testimony of American Electronics Association presented by Tom Long, Tektronix, Inc.). Dr. Robert Cohen, a consultant to the American Electronics Association, testified that the Congressional Budget Office viewpoint "is a direct result of [the Congressional Budget Office] being unwilling to consider the broader applications of high definition systems." *Id.* at 126. Juan A. Benitez, the Deputy Assistant Secretary of Commerce for Science and Electronics, noted that the Congressional Budget Office report is "inaccurate in some areas," specifically in regard to its pessimistic conclusions regarding demand for U.S.-made semiconductors. *Id.* at 100.

25. NTIA Report, *supra* note 9, at 44.

26. Far-sighted initiatives already begun in Japan and Europe are an indication that our competitors view HDTV as a worthwhile endeavor. See *supra* note 4.

States will transfer wealth to nations such as Japan who are poised to seize the American market. U.S. standards policy should account for the economic dynamics of HDTV's inevitable growth.

### B. *National Security*

National security has been offered as another rationale for the importance of a robust HDTV industry to the United States. HDTV technologies, both existing and potential, are highly dependent on semiconductor technology; the Department of Defense realizes that many other defense technologies (most importantly computers) rely heavily on state-of-the-art semiconductors and thus the Pentagon is interested in using the HDTV industry as a catalyst for the revival of the domestic semiconductor industry. The fact that HDTV will allow sharper, clearer displays for critical functions is of importance to the military;<sup>27</sup> more importantly, "the Pentagon itself needs a strong commercial economy for many products vital to the national defense. If, for example, the U.S. semiconductor industry were to vanish, the Pentagon would either depend on foreign producers for a strategic product or would maintain an in-house semiconductor industry at astronomical expense."<sup>28</sup> During wartime or in times when war appears imminent, national security may require an increase in the supply of various high-technology items. Because the technologies change too rapidly, such items cannot be easily stockpiled during peacetime. Additionally, foreign suppliers may not be in a position to meet increased demand, or they may wish to halt supplies to the United States altogether. As Dr. Craig Fields, Director of the Defense Advanced Research Projects Agency (DARPA), stated, "[f]rom a defense point of view we want to minimize our dependency on foreign sources for the essential elements of our weapons systems. Those essential elements certainly are centered on semiconductors."<sup>29</sup> The failing semiconductor industry,<sup>30</sup> an industry

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27. Perhaps HDTV displays could have prevented some of the casualties suffered by coalition forces during operation Desert Storm as a result of "friendly fire," given that the existing weapons systems "were unable to discern the difference between enemy vehicles and allied vehicles because the sighting display equipment was too fuzzy." 137 CONG. REC. H6927 (daily ed. Sept. 26, 1991) (statement of Rep. Bentley).

28. Robert Kuttner, *Industry Needs a Better Incubator than the Pentagon*, BUS. WK., Apr. 30, 1990, at 16.

29. *High Definition Television—Developing a National Technology Strategy for High Definition Television: Hearing Before the Subcomm. of Science, Technology, and Space of the Senate Comm. on Commerce, Science, and Transportation*, 101st Cong., 1st Sess. 4-5 (1989) [hereinafter *National Technology Strategy Hearing*] (statement of Dr. Craig Fields, Director, Defense Advanced Research Projects Agency).

whose products have key defense applications, may be driven by increased development of HDTV.

Efforts to stimulate research and development of defense applications for HDTV have been overseen by DARPA, however cutbacks in the agency's funding have crippled those efforts. In 1989, DARPA received a strong response from private industry when it announced it would spend \$30 million among worthwhile proposals submitted by firms willing to take part in HDTV projects for the military. Although \$30 million is a relatively small amount (considering DARPA's budget in excess of \$1 billion), considerable interest was shown by U.S. companies seeking funding.<sup>31</sup> Despite this encouraging reaction from the private sector, the Bush administration later urged diversion of \$20 million away from HDTV research.<sup>32</sup> In 1991, the House of Representatives included \$100 million for research and development of HDTV flat panel display technologies in the Department of Defense appropriations bill for fiscal year 1992, but the Office of Management and Budget categorized the funding as being primarily for the development of a commercial technology, and the Department of Defense was forced to request that the Senate disallow the funding.<sup>33</sup> Therefore, despite the role HDTV could play in reviving the semiconductor industry and easing U.S. dependence on foreign high-technology, the current administration appears unwilling to make the relatively small investment in research and development that would likely bring results. The perceived military needs will remain, and

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30. The U.S. semiconductor industry peaked in the mid-1970s when it held 60 percent of the world market; by 1987, the U.S. share of the world market had eroded to 40 percent, and recent projections of rapid growth for the world market itself indicate that the relative position of the United States in the world market will continue to slip. See DERTOUZOS, *supra* note 8, at 248-61.

31. DARPA received over eighty proposals seeking a share of the dedicated funds, with requests for funding totaling about \$200 million. The contents of the proposals were termed "out-standing," and industry showed a great willingness to share costs. See *HDTV Hearing*, *supra* note 4, at 100-01 (statement of Dr. Craig Fields); U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, *THE BIG PICTURE: HDTV & HIGH-RESOLUTION SYSTEMS* 36-37 (1990) (Background Paper) [hereinafter *THE BIG PICTURE*].

32. *Hill Reaction Explosive; Administration Reportedly Wants to Divert DARPA HDTV Funds to Other Uses*, COMM. DAILY, Apr. 9, 1990, at 1, available in LEXIS, Fedcom Library, Comdly File.

33. 137 CONG. REC. H6927 (daily ed. Sept. 26, 1991). The Department of Defense policy of rejecting appropriations that are aimed at developing commercial, as opposed to military, technologies is an example of the reluctance of the federal government to intervene in the private marketplace. See *supra* note 3. However, this policy may be abandoned if it interferes with a political agenda, as it was in regard to the Strategic Defense Initiative (SDI) backed by the Reagan administration. The Pentagon's Strategic Defense Initiative Office has established a database of SDI technology for use by the private sector. See Gary Anthes, *SDI Information Database Available for Commercial Use*, COMPUTERWORLD, Dec. 17, 1990, at 6.

they will be met mainly by foreign suppliers if HDTV is not supported by the federal government.

### C. *Technological Leadership*

Aside from the economic and military aspects of HDTV, there exists a perception by some that the outcome of the advanced television battle will reflect on the position of the United States as a world leader in general. HDTV has been singled out as the cornerstone of future American success in all fields of high technology.<sup>34</sup> As one commentator wrote,

[t]he ramifications of HDTV have expanded beyond technology and marketing into the realm of politics. The political and legislative questions raised by the push for "high-def" promise to be far more difficult to resolve than the technical problems. From Capitol Hill to the Pentagon, HDTV has become the lightning rod for marshalling concern over the future of "good old" American leadership.<sup>35</sup>

Treating HDTV as an indicator of America's innovative strength is understandable given the pervasiveness of television as a mass medium in our society. The general public is more apt to measure the technological status of the United States by assessing advances made in a commonplace item — the television — rather than by focusing on breakthroughs in less visible items, such as computer memory chips. Because the public can readily appreciate improvements in television, rhetoric that appeals to the symbolic meaning of HDTV competition is valuable as a tool to rally support for pro-HDTV initiatives. Nevertheless, such rhetoric tends to overstate the significance of HDTV as it relates to our position as a world leader in high technology. As will be discussed later, U.S. firms have not fallen behind their international competitors on a technological level. Where U.S. firms *have* fallen behind is in the ability to efficiently manufacture and market items that are within their capability to create.<sup>36</sup> The economic and strategic concerns discussed above provide more substan-

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34. "HDTV has become a symbol of the importance of technological development to U.S. competitiveness. Many see developments in the TV business as our nation's 'once in a lifetime opportunity' to seize dominance in nearly every technology." *National Technology Strategy Hearing*, *supra* note 29, at 57 (statement of Donald F. Johnstone, President and Chief Executive Officer of Philips Consumer Electronics Co., a Division of North American Philips Corp.). See also Jack Shandle & Amy Rosewater, *Political Lightning Rod: In the U.S., HDTV is Becoming a Focal Point for the Competitiveness Issue*, *ELECTRONICS*, Oct. 1990, at 57.

35. Jerry Whitaker, *Foreword* to BENSON & FINK, *supra* note 2, at xiii (1991).

36. See generally DERTOUZOS, *supra* note 8, at 67-80; Stephen Mraz, *U.S. Must Put R&D to Work*, *MACHINE DESIGN*, Apr. 25, 1991, at 24; Anthony L. Velocci, *Slow Pace of Technology Innovation Tied to Short-Sighted U.S. Policies*, *AVIATION WK. & SPACE TECH.*, Jan. 13, 1992.

tial justification for setting U.S. standards policy so as to give the HDTV industry a chance to survive in this country. Patriotic arguments based solely on "technological leadership" may sound persuasive, but they actually miss the point. Taking advantage of our technological leadership, not establishing it, is the point behind supporting a domestic HDTV industry.

### III. GOVERNMENTAL NONINTERVENTION AND THE ROLE OF STANDARDS

The federal government has three general means of improving the probability that HDTV will succeed as an industry in the United States. First, the government can directly allocate funds for research and development in the private sector. An example of such an approach is mentioned above: the \$30 million in DARPA grants. A second way in which the government can help industry is to create an atmosphere conducive to private investment in HDTV, primarily through relaxation of existing antitrust laws, tax incentives for research and development, and stricter enforcement of antidumping laws.<sup>37</sup> Finally, the federal government can aid the cause by adopting technical standards for production and transmission of HDTV programs in an intelligent manner. Setting helpful technical standards in a timely manner is essential to the effectiveness of any financial or legislative assistance; "all the money in the treasury won't put the U.S. into the HDTV picture unless we have a comprehensive U.S. standards policy that will help promote the interests

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37. Antidumping laws are designed to prevent foreign competitors from engaging in the predatory trade practice of "dumping". Dumping involves selling goods at below cost in a competitor's market and is often done in conjunction with protectionist trade barriers that allow the seller to charge inflated prices in its domestic market. By dumping goods, a seller can force competition out of an industry, after which it can raise prices to above-cost levels. For a more technical explanation of dumping, see John H. Jackson, *Dumping in International Trade: Its Meaning and Context*, in *ANTIDUMPING LAW AND PRACTICE* 1-22 (John J. Jackson & Edwin A. Vermulst eds., 1989).

Far Eastern producers, taking advantage of loopholes in U.S. antidumping laws and the lack of aggressive enforcement, used dumping to effectively eliminate U.S. companies from the television manufacturing industry. This has prompted a push for better antidumping measures. See *National Technology Strategy Hearing*, *supra* note 29, at 40 (statement of Jerry Pearlman, President and Chief Executive Officer, Zenith Corp.). See also JOHN M. CULBERTSON, *THE TRADE THREAT AND U.S. TRADE POLICY* 192-93 (1989) (discussing the vulnerability of the United States to dumping due to the lack of an effective trade policy); Ruth S. Raubitschek, *Discussion*, in *TRADE FRICTION AND ECONOMIC POLICY: PROBLEMS AND PROSPECTS FOR JAPAN AND THE UNITED STATES* 230, 235 (Ryuzo Sato & Paul Wachtel eds., 1987) ("Dumping is difficult to measure in a high technology industry because of the dynamic nature of costs and prices. Furthermore, the current legal process for relief is too slow to be effective given the fast pace of innovation in the [semiconductor] industry.").

of both the U.S. consumer and U.S. industry, and this is an appropriate role for government leadership."<sup>38</sup> Technical standards, while crucial for the potential catalytic role they may play in combination with other government measures, will take on greater significance as Congress and the Bush administration retreat from supporting HDTV. While other actions are contingent upon budgetary constraints and politics, standards will eventually be adopted. One further thing is certain: technical standards will have an effect on the growth of HDTV in this country with or without funding and legislation facilitating domestic investment in HDTV manufacturing.

### A. *Legislative Efforts*

Presently, the most likely scenario appears to be one in which the federal government does little more than adopt standards. Legislative plans to provide direct funding for HDTV initiatives, discussed below, have fallen prey to deficit reduction efforts. Antitrust reforms and tax incentives aimed at helping U.S. companies rejoin the consumer electronics industry, also treated below, have likewise lacked widespread support. As these measures succumb to political and ideological opposition, companies interested in entering the HDTV industry may be discouraged from doing so, particularly if the federal government does not demonstrate to industry that it has a coherent strategy for the adoption of technical standards.

The list of unenacted bills drafted to directly stimulate domestic investment in HDTV research and development illustrates a trend of governmental nonintervention. In February of 1989, Representatives Richard Boucher (D-VA) and Thomas Campbell (R-CA) introduced the National Cooperative Innovation and Commercialization Act of 1989.<sup>39</sup> The bill established a framework within which firms may seek administrative approval for cooperative innovation agreements and thus avoid criminal and civil antitrust actions; it was referred to the House Commit-

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38. *High Definition Television: The International HDTV Standard-Setting Process and the Role of International Standards on U.S. Competitiveness: Hearing Before the Subcomm. on International Scientific Cooperation of the House Comm. on Science, Space, and Technology*, 101st Cong., 1st Sess. 38, 41 (1989) [hereinafter *International HDTV Standard-Setting Process Hearing*] (statement of Daniel S. Lankford, Market Development Vice President, AT&T Microelectronics). While the hearing dealt substantially with international production standards, Mr. Lankford's statement was made in the context of comments concerning both domestic transmission standards and international production standards. See *id.* at 42-44.

39. H.R. 1024, 101st Cong., 1st Sess. (1989). See House Bills, 2 Cong. Index (CCH) 28,212, 35,014 (1989).

tee on the Judiciary and then to the House Subcommittee on Economic and Commercial Law, but no further action was taken. That bill was soon followed by the High Definition Television Competitiveness Act of 1989,<sup>40</sup> a measure sponsored by Representatives Donald Ritter (R-PA) and Mel Levine (D-CA) which contained provisions creating financial assistance programs and tax incentives for research and development, as well as antitrust exemptions for HDTV joint ventures.<sup>41</sup> The Act also would have appropriated an additional \$500,000 to the Federal Communications Commission (FCC) for fiscal year 1989 to enable the Commission to study the question of an HDTV broadcast standard, but it never made it to the House floor. The High Definition Television Research and Development Act of 1989,<sup>42</sup> which sought to improve the competitiveness of the domestic HDTV industry through a program of cooperative research and development and technology-sharing, died in committee. Representative Ritter also co-introduced the Advanced Television Competitiveness Act of 1989,<sup>43</sup> which would have established an industry consortium partially financed by government loans and grants.<sup>44</sup> At the same time, a Senate bill designed to legitimize such joint ventures

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40. H.R. 1267, 101st Cong., 1st Sess. (1989), reprinted in *HDTV Hearing*, *supra* note 4, at 330.

41. Financial assistance is contemplated under H.R. 1267 through competitive applications submitted to the Secretary of Commerce by interested cooperative HDTV enterprises. H.R. 1267, 101st Cong, 1st Sess. §§ 302-306 (1989). The Act also attempted to create tax incentives for HDTV research and development by repealing § 4(g) of the Internal Revenue Code of 1986, which provides a termination date of the tax credit for increasing research expenditures, and by repealing § 280(c) of the Code to allow a tax deduction for amounts allowed as a research credit. *Id.* at § 102. Antitrust obstacles would have been removed by the Act via amendment of the Communications Act of 1934 to provide an exception for cooperative HDTV enterprises, and via amendment of the National Cooperative Research Act of 1984 to include cooperative HDTV enterprises under its protection. *Id.* at §§ 202-203. See *HDTV Hearing*, *supra* note 4, at 330-42.

42. H.R. 1516, 101st Cong., 1st Sess. (1989) reprinted in *HDTV Hearing*, *supra* note 4, at 342.

43. H.R. 2287, 101st Cong., 1st Sess. (1989).

44. The consortium envisioned by the authors of the bill is modelled after a European HDTV joint venture known as Eureka '95. See *HDTV Week on Capitol Hill*, BROADCASTING, May 15, 1989, at 67, 68. Eureka '95 was begun in 1986 by Bosch of West Germany, Philips of the Netherlands, Thomson of France, and Thorn-EMI of the United Kingdom, and today it includes many more European electronics companies. Eureka '95 is a result of the European Eureka program, a joint research and development effort that promotes and helps to fund multicorporation, multinational projects. Eureka '95 has been successful in adopting its own set of production standards for HDTV, with both European and U.S. markets in mind. A large factor in the success of Eureka '95 is that participating companies retain all rights to technologies developed within the program, which provides companies with an incentive to devote resources to the venture. See generally Alan G. Stoddard & Mark D. Dibner, *Europe's HDTV: Tuning Out Japan*, TECH. REV., Apr. 1989, at 39.

There has been some effort by private U.S. corporations to join together despite the lack of government assistance. Xerox is reportedly organizing a research and development consortium that will invest over \$100 million in developing flat-panel display technology for HDTV. *Newstrack: HDTV may be the Ace*, COMM. ACM, Dec. 1990, at 10.

through amendment of antitrust laws was introduced,<sup>45</sup> but neither bill was successful. Another proposed action that lacked the necessary votes for passage was the High Definition Television Act of 1990,<sup>46</sup> a plan to prohibit interstate commerce in high definition television sets that do not contain minimum levels of domestic hardware.<sup>47</sup> Finally, the Advanced Television Standards Act of 1990<sup>48</sup> failed to attract the support needed for passage, even though its primary purpose was to provide momentum and coherence to the standard selection process rather than commercial incentives for domestic initiatives.<sup>49</sup>

The onslaught of legislative proposals has failed to generate any meaningful assistance for the infant HDTV industry. The reason government is hesitant to back the private sector on HDTV is linked to the fact that technical standards have not yet been chosen. Generally speaking, government wants industry to take the lead in developing HDTV.<sup>50</sup> Industry, however, is waiting for government to reduce the risks involved in joining the new industry; at the very least, potential HDTV manufacturers need to know what standards will prevail to allow them to focus their research and development efforts. The situation is somewhat circular, considering that government has necessarily solicited private input

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45. S. 952, 101st Cong., 1st Sess. (1989).

46. H.R. 4764, 101st Cong., 2d Sess. (1990).

47. The scheme set out in the bill calls for a gradual increase in the percentage of U.S. made parts and components that make up an HDTV set based on value. Interstate commerce in and importation of sets that do not meet minimum domestic content requirements would be prohibited. During its first year in the market, a company would have to include 10 percent U.S. parts; this requirement increases to 30 percent in the third year and levels off at 51 percent during the fifth year of market participation. See 136 CONG. REC. E1456 (daily ed. May 9, 1990) (statement of Rep. Gejdenson).

48. H.R. 4933, 101st Cong., 2d Sess. (1990).

49. The bill, which had been approved by the House Subcommittee on Telecommunications and Finance for full Committee action, authorized appropriations to the FCC for the establishment of an advanced television task force, the purchase of testing equipment, and the hiring of any additional personnel needed to develop and promulgate a transmission standard. Also, the bill sought to place the NTIA in charge of U.S. policy regarding adoption of international production standards. *Id.*

50. Commerce Secretary Robert Mosbacher expressed Bush administration sentiment that although HDTV is viewed as being important, competitive forces should drive efforts to develop HDTV, not government planning. See *Shakeout Likely: NAB Displays Show Rapid Maturation of HDTV*, COMM. DAILY, May 2, 1989, at 3, available in LEXIS, Fedcom Library, Comdly File. Also, the Bush administration sent a clear message that it does not want DARPA meddling in the creation of a federal "industrial policy" by removing DARPA director Craig Fields from his post in April of 1990. The move was a response to Fields' outspoken support for government-funded high technology initiatives. The ouster was not well-received. See, e.g., Trends, Forecasts and Analyses: *DARPA Chief Out*, INSIDE R&D, May 2, 1990, at 2; Elizabeth Corcoran, *Talking Policy: The Administration Devises an Industrial Policy—Sort of*, SCI. AM., June 1990, at 82.



toward the selection of standards.<sup>51</sup> Until standards are set, industry will be slow to move on HDTV.

### B. *Standards as the Primary Policy Option*

The lack of support for vigorous and direct pro-HDTV legislation, discussed above, has by default left the standard-setting process at the forefront of government's involvement in promoting HDTV. Lawmakers have permitted the process to move forward by allowing bodies such as the FCC and the Department of State to take action on proposed standards. It is likely that an amended version of the Emerging Telecommunications Technologies Act of 1991,<sup>52</sup> already passed in the House, will make it through the Senate. The Act requires the Secretary of Commerce to make additional frequencies available for commercial assignment in order to promote new telecommunications technologies; this would facilitate the FCC's selection of a transmission standard for HDTV given HDTV's need for additional spectrum.<sup>53</sup> The NTIA Organization and Authorization Act,<sup>54</sup> if enacted, will permit the NTIA to continue its active role in the international debate over production standards, although the Department of State will remain the ultimate voice of U.S. policy in that area.<sup>55</sup> With the defeat of legislative efforts to help mobilize private investment in HDTV, industry continues to await the outcome of the administrative standards-selection process.

It is possible that once standards are chosen and more U.S. companies begin to commit resources to HDTV development, Congress will remain content to be a spectator in the battle for market-share. Thus,

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51. In a Notice of Inquiry released on August 20, 1987, the FCC solicited comments from industry groups and other interested parties in regard to advanced television broadcast issues. *See In re Advanced Television Systems and Their Impact on the Existing Television Broadcast Service*, 2 F.C.C.R. 5125, 5129-39 (1987) (Notice of Inquiry) [hereinafter Notice of Inquiry]. The FCC again requested public input to narrow advanced television broadcast issues in a Further Notice of Inquiry released on September 1, 1988. *See Further Notice*, *supra* note 1, at 6520, 6534-41.

52. H.R. 531, 102d Cong., 1st Sess. (1991).

53. *See infra* part V.

54. H.R. 3031, 102d Cong., 1st Sess. (1991).

55. The Advanced Television Standards Act of 1990, which was never passed, would have put the NTIA in charge of U.S. policy toward international standards. H.R. 4933, 101st Cong., 2d Sess. § 4 (1990). The Committee on Energy and Finance, in its favorable report on the NTIA Organization and Authorization Act, noted that the NTIA "has taken an increasingly active role in international telecommunications issues" and "has protected U.S. interests in the critical [area] of technical standards." H.R. Rep. No. 335, 102d Cong., 1st Sess. 9 (1991). Nevertheless, H.R. 3031 explicitly provides that "[n]othing in this Act reassigns any function . . . vested by law or executive order in the Federal Communications Commission or the Department of State, or any officer thereof." H.R. 3031, 102d Cong., 1st Sess. § 4(f)(3) (1991).

standards may be the *only* way in which the federal government will involve itself in the development of HDTV in this country. The standards adopted will have an effect on who is willing to take the risks of entering the industry. On a domestic level, broadcasters will have to compete with cable operators, video retailers, satellite feeders, and perhaps even phone companies<sup>56</sup> for a share of the HDTV viewing audience. On an international level, U.S. HDTV manufacturers must battle with Japanese and European oligopolies for world market share. Standards will effect the degree of acceptance HDTV will gain in this country, and they will help determine whether HDTV is viewed on U.S. or foreign-made sets. If proper standards are chosen, the result may be a demand for HDTV broadcasts from local broadcasters that will be viewed on domestically produced sets; if not, the dominant video media will probably be cable and foreign-made video cassette recorders connected to foreign-made television sets. It is crucial that the government chooses standards wisely.

#### IV. PRODUCTION STANDARDS

##### A. *Definition and Background*

Production standards pertain to the technical parameters associated with equipment used in the creation of an HDTV program, and therefore they affect the compatibility of programs with viewing equipment. An example of a production standard is the 35mm standard for films; foreign films may be viewed with the same equipment used to view Hollywood films because they adhere to the same production standards. An example of an HDTV production standard is the number of horizontal lines that make up the picture; more horizontal lines translate into a sharper picture. Another example is the frequency of picture scanning, or the number of times per second that the picture is electronically redrawn. The issue of production standards is, by nature, an international one, because uniformity of production standards among trading partners greatly facilitates market exchange in HDTV programming. Presently, the status of worldwide production standards for HDTV is unsettled. There is a basic disagreement between Europe and Japan over production standards, with each side touting its own proposal as being best suited for worldwide adoption. The Japanese Broadcasting Co. (NHK) has developed and promoted a system based on 1125 horizontal lines and

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56. Phone companies may someday be allowed to transmit programming over fiber-optic phone lines. Regional phone companies would be able to justify the cost of installing fiber-optic cables to every residence if they were legally allowed to carry video. William J. Cook, *Spoils of a Good Air War*, U.S. NEWS & WORLD REP., Sept. 10, 1990, at 75.

a 60 hertz<sup>57</sup> redraw frequency (1125/60), while the European Community insists on a 1250/50 standard.<sup>58</sup> Because electricity is delivered to homes and offices in the United States at 60 hertz, the European 50 hertz standard would be difficult to implement here.<sup>59</sup> Thus the basic question for U.S. policy makers is whether the United States should adopt the NHK 1125/60 standard, or whether it should develop a production standard of its own. The United States must choose its HDTV production standards to maximize economic opportunity; doing so, however, may mean sacrificing trade opportunities in HDTV programming for trade opportunities in domestically manufactured HDTV equipment.

### B. Policy Considerations

If the United States is to have any chance of competing in the world HDTV marketplace, it should continue to resist the temptation to adopt the NHK standard. Justification for this stance may be found by recognizing U.S. technological capabilities and the structure of U.S. media, as well as the low probability that any standard will be accepted as the sole worldwide standard. A domestic production standard will not serve as a trade barrier, given that competitors will eventually build equipment that will conform to any standard that controls in a significant market,<sup>60</sup> but it will allow the United States to compete. Although it will take much more than a national approach to production standards to insure a large market-share for U.S. producers, "[a] unique indigenous standard . . . can have a major impact on the development of an infant industry like this one. It also provides the only means for making sure special conditions or peculiarities of the market are taken into account."<sup>61</sup> In this section, the policy considerations that will influence the selection of production standards will be discussed. Policy regarding the selection of a production standard has been, and continues to be, influenced by two major factors: international trade in HDTV programming and the unique nature of the U.S. marketplace.

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57. One hertz is equal to one cycle per second, so 60 hertz equals 60 cycles per second.

58. See discussion *infra* part IV.B.1.

59. Not only would the European format be costly to implement here, it has also been shown to be inferior to the Japanese standard in almost all tested categories by a Moscow research group. See *1,125/60 HDTV Standard Wins Head-to-Head Competition with Europeans*, COMM. DAILY, July 27, 1990, at 4, available in LEXIS, Fedcom Library, Comdly File.

60. The Japanese have already indicated that they are prepared to build HDTV products in accordance with any western standards which may be adopted. See *Consumer Electronics; Telly Diplomacy*, ECONOMIST, May 19, 1990 (Business), at 78; Satoshi Isaka, *Makers Set to Cope with Two HDTV Standards*, JAPAN ECON. J., Mar. 17, 1990, (Industry), at 13.

61. 135 CONG. REC. S3481 (1989) (statement of Sen. Heinz).

1. *The Present U.S. Stance.* The international body attempting to resolve the issue of production standards is the International Radio Consultative Committee (CCIR). The CCIR is a permanent branch of the International Telecommunications Union, a specialized agency of the United Nations charged with the coordination, regulation, and standardization of telecommunications worldwide. U.S. interests at the CCIR are represented by the Department of State, which acts on recommendations from the FCC, the Department of Commerce (through the NTIA), and private sector organizations such as the Advanced Television Systems Committee, among others.<sup>62</sup> In 1986, the CCIR attempted to standardize studio production parameters for HDTV at a meeting in Dubrovnik, Yugoslavia. At that session, the United States favored adoption of the Japanese NHK system; nevertheless, representatives from West European nations successfully blocked its selection.<sup>63</sup> The stalemate resulted in a four year period during which new HDTV proposals could be submitted prior to the CCIR's next meeting on the issue in May of 1990. During this time, U.S. opposition to the Japanese standard gained momentum,<sup>64</sup> the result of which has been a retreat by the United States from support for international adoption of a compromise "common image format"<sup>65</sup> to a position recently taken by the Commerce Department that the United States should avoid any world HDTV production agreements until more advanced technology is developed.<sup>66</sup> The 1990 gathering of the CCIR produced agreement on some parameters, however no agreement was reached regarding the two key variables: the number of horizontal scan lines and the image redraw frequency.<sup>67</sup> The CCIR has

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62. For a more detailed description of the structure behind U.S. policy formulation in this area, see Sonia Landau, *Toward a Global High-Definition TV Production Standard*, DEP'T ST. BULL., June 1989, at 48-49.

63. See *CCIR Puts End to Hope for HDTV Standard*, BROADCASTING, May 19, 1986, at 70.

64. Criticism that the State Department had exceeded its authority in advocating the NHK standard came from House Commerce Committee Chairman Dingell and Telecommunications Subcommittee Chairman Markey, who introduced legislation to place the Department of Commerce in charge of U.S. policy on production standards. See *Markey Bills Put HDTV Work Under Commerce Roof*, BROADCASTING, Mar. 12, 1990, at 34; *New Turf War: Dingell and Markey Attack State Department HDTV Activities*, COMM. DAILY, Mar. 13, 1989, at 2, available in LEXIS, Fedcom Library, Comdly File.

65. A "common image format" would standardize all production parameters except the redraw rate, which is the basic obstacle to an international consensus. See Randall M. Sukow, *State of the Art: Television Technology*, BROADCASTING, Oct. 15, 1990, at 42.

66. See *Markey Bills Put HDTV Work Under Commerce Roof*, BROADCASTING, Mar. 12, 1990, at 34.

67. *Rules Set For New-Era TV, But Key Standards Still Open*, REUTER BUSINESS REPORT, May 24, 1990, available in LEXIS, Nexis Library, Busrpt File.

opted to conduct further studies before addressing the issue at its next plenary session in 1994. The extra time is a mixed blessing for the United States, which now has time to develop and submit its own production standard for consideration by the CCIR, but must also contend with the reality that the Japanese standard may emerge as a *de facto* standard due to the delay.<sup>68</sup> Even if a *de facto* standard does not emerge, it is clear that the basic disagreement between Japan and the European Community will continue to thwart efforts to agree upon a universal and comprehensive set of production standards. It is against this background that U.S. policy must be refined.

2. *International Trade in HDTV Programming.* One factor which U.S. policymakers must consider is the importance of global standardization to U.S. programming producers and exporters. Producers and exporters fear that postponement of efforts to reach international agreement on production standards will jeopardize international trade in HDTV programming for two reasons: program producers in the United States will be unable to justify purchasing HDTV studio equipment that may be rendered obsolete by a new standard, and lack of a worldwide standard will add conversion costs to programming exports. For these reasons, producers and exporters favor the 1125/60 NHK standard.<sup>69</sup> "The United States will be the biggest casualty if a single worldwide production standard is not established, because the U.S. is the largest exporter of programming throughout the world."<sup>70</sup> This argument is too narrow because it ignores the effects a Japanese standard will have on

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68. The confusion regarding worldwide standards has prompted Japanese companies to seek out commercial customers willing to buy costly first-generation HDTV equipment that conforms to the NHK standard. By doing so, the companies hope the NHK standard will gain widespread unofficial acceptance. See Peter Burrows, *Japan is Ready for HDTV, But the Rest of the World Isn't*, ELECTRONIC BUS., Aug. 20, 1990, at 30, available in Lexis, Nexis Library, Elcbus File.

69. See Ron Whittaker, *U.S. Programming Edge Depends on HDTV*, ELECTRONIC MEDIA, June 19, 1989, at 52. An organization consisting of production equipment manufacturers and program production companies, calling itself the "1125/60 HDTV Production Group," submitted a letter dated February 1, 1989, to the House Subcommittee on Telecommunications and Finance. The letter urged U.S. support for the 1125/60 standard, claiming that the standard would be beneficial to U.S. commercial interests. See PUBLIC POLICY IMPLICATIONS, *supra* note 22, at 513-22. The true motivation of the group may have been to further Japanese commercial interests, given that the group's membership included such Japanese-owned companies as Hitachi Sales Corporation, Sony Corporation of America, Mitsubishi Electronics, Toshiba America, and U.S. JVC (Japan Victor Corporation).

70. *HDTV Production Standard Debated at NTIA*, BROADCASTING, Mar. 13, 1989 (statement of Jeff Mullarkey, assistant vice president, Toshiba America Inc.). Not surprisingly, this viewpoint is shared by CBS Inc., a major programming exporter. See PUBLIC POLICY IMPLICATIONS, *supra* note 22, at 136-51.

HDTV manufacturing, and it also ignores the reality that Europe will not adhere to the 1125/60 standard. While the United States may enjoy a trade surplus in programming exports, the value of that surplus will be dwarfed by the downward pull a Japanese standard would have on the consumer electronics and semiconductor industries.<sup>71</sup> The argument is also overly optimistic in view of Europe's adamant refusal to adopt any standard but its own.<sup>72</sup> The European market for programming, which contributes to our trade surplus, will probably adhere to a different set of production standards, making U.S. programming products more costly due to conversion problems. If the U.S. selects the NHK standard, it risks allowing the Japanese a huge edge in economies of scale without ever realizing the trade benefits a single worldwide standard might bring. The ideal scenario, from a U.S. perspective, would be for the rest of the world to rally around a standard developed and tested in the United States with peculiarities of the U.S. market in mind. Given the potential size of the U.S. markets for equipment and programming,<sup>73</sup> Japanese and European producers may even find it economically advantageous to conform to U.S. standards.<sup>74</sup>

3. *The Unique Nature of the U.S. Marketplace.* Another factor that officials from the FCC, NTIA and State Department must consider is the distinct form of the U.S. communications infrastructure. The NHK standard was selected with neither the U.S. need to accommodate new technologies nor the U.S. video media structure in mind, and thus it is substantively deficient for use in this country. A domestically developed production standard will permit U.S. firms to take advantage of digital technology, and it will harmonize video production with American transmission practices.

By not prematurely rushing into agreement on production standards, the United States will preserve an opportunity for domestic com-

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71. The current U.S. trade surplus in motion pictures and television programming is approximately \$3 billion. However, the potential U.S. trade deficit in HDTV-related industries could exceed \$200 billion if domestic firms are not able to compete on the world market. See Whittaker, *supra* note 69, at 52; *supra* note 22 and accompanying text.

72. See *supra* note 63 and accompanying text.

73. For a discussion of the U.S. market for equipment, see *supra* part II.A. The U.S. market for entertainment programming should also be large, based on consumer expenditures in past years. In 1990, Americans spent approximately \$30 billion to view filmed entertainment. Of that total, almost 50 percent was spent for home viewing of cable television; 35 percent went for rental or purchase of videos, and the remaining 15 percent was spent at movie theaters. See *Leisure Time Basic Analysis*, Mar. 14, 1991, in STANDARD & POOR'S INDUS. SURV., at L29 (Apr. 1991).

74. See *supra* note 60.

panies to study and develop technologies which may render Japanese and European formats obsolete. Currently, both the NHK and European systems are analog-based; with its strong computer industry to assist it, the United States can develop a higher quality digital-based HDTV system.<sup>75</sup> A digital-based HDTV system would lead to a greater variety of applications than an analog-based system, including computerized multimedia systems in the home.<sup>76</sup> If the United States adopts the analog Japanese standard, it will prevent American firms from utilizing their technological superiority to surpass world competitors. By focusing on a digital approach to HDTV, the United States can "leap-frog" the Japanese and Europeans.<sup>77</sup>

The analog nature of current technology is not the only weakness of the Japanese system, insofar as U.S. interests are concerned. The NHK production standard was originally designed to interact with a satellite transmission system, the basic programming medium in Japan. The U.S. media structure relies far more heavily on local broadcasting and cable to bring television into homes and offices, and so the Japanese format is technically inadequate for the U.S. market. The same flaw exists for the European standard.<sup>78</sup>

The systems proposed . . . are very wasteful of spectrum and bandwidth. They are clever in some respects but they are poorly designed to be compatible with existing television; there's no transition strategy whatsoever; they require complicated converters. Instead, they have been optimized for direct satellite delivery, not over-the-air broadcasting, not cable, not future fiber.<sup>79</sup>

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75. Analog-based items are driven by signals in the form of a wave. For example, televisions, grooved records, cassette tapes, and telephones are all analog-based. Wave-form signals are subject to distortion during passage through a medium such as a wire, and thus exact reproduction of an analog input signal by the signal receiver is impossible. Digital technology, which is the foundation for modern-day computers, uses a binomial coding system in which all signals consist of ones and zeroes. The input signal is the same as the output signal in a digital-based system. An example of digital technology is the compact disc. A digital-based HDTV system could be linked to computer systems to produce many new graphics applications.

76. An ideal "digital home of the future" could include some dazzling features, including auxiliary equipment for a home entertainment system that would allow the user to edit images and music with ease, and a feedback controller that would enable the user to respond to interactive television programs. For a discussion of potential applications of digital technology, see Otis Port et al., *High-Definition TV is Rallying a Digital Revolution*, BUS. WK., Jan. 30, 1989, at 64.

77. *National Technology Strategy Hearing*, *supra* note 29, at 148 (statement of John J. Sie, Senior Vice President, Tele-Communications, Inc.).

78. See, e.g., Helmut Schafer, *A European View of Competition and Control in a Multimedia Society*, in VIDEO MEDIA COMPETITION: REGULATION, ECONOMICS, AND TECHNOLOGY 405 (Eli M. Noam ed., 1985).

79. *International HDTV Standard-Setting Process Hearing*, *supra* note 38, at 65 (statement of

Because the question of transmission standards is still unsettled in this country, it would be a disservice to the television media to adopt a set of production standards designed to be compatible with Japanese transmission practices.

It is fortunate that the United States is now aware of the inadequacies inherent in the Japanese system. The State Department is no longer plunging blindly into acceptance of the NHK standard, as voices downplaying the need for that standard have been heard. Proponents of the Japanese standard have lobbied hard for its adoption, primarily because they realize the economic stakes involved.<sup>80</sup> The United States, however, has come to realize that "the principal motive behind pushing the NHK system is, and the main effect of adopting it would be, to advance Japanese economic interests to the detriment of our own."<sup>81</sup> The United States government must do more than merely reject the NHK standard — it must promote research and selection of production standards which are digital-based and which allow for an adequate transition to HDTV in the U.S. television market. By doing so in a timely fashion, problems encountered by programming producers and exporters will be minimized. While standardization remains a desirable concept, it is unrealistic to expect that it will be achieved; the best the United States can do is forge ahead with its own standard and hope that other countries decide to follow.

## V. TRANSMISSION STANDARDS

### A. *Definition and Background*

The success of the HDTV industry in the United States is linked not only to international production standards, but also to domestic transmission standards. Transmission standards govern the way in which we receive HDTV programming. There are four basic media by which HDTV will be viewed in the near future: terrestrial ("over the air-waves") broadcasting, cable, direct broadcast satellite, and VCRs. Another prospective medium under development is optical fiber. All of

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Richard Solomon, Research Associate, Program on Communications Policy and The Media Laboratory, MIT).

80. Japanese-owned firms in the United States have been quick to express their opinion that the 1125/60 standard is the one best suited for worldwide adoption. *See supra* note 69. "Given their lead in developing HDTV technology and their desire to penetrate foreign markets, the Japanese have worked intensively to ensure that their standard was adopted worldwide." *THE BIG PICTURE*, *supra* note 31, at 32.

81. PUBLIC POLICY IMPLICATIONS, *supra* note 22, at 549 (comment of William Schreiber, Director, Advanced Television Research Program, MIT).



these media have transmission standards, but terrestrial broadcasting is unique in that its transmission standard is the only one subject to governmental regulation and constraints. Terrestrial broadcasting is federally regulated because it uses a portion of the electromagnetic spectrum, which is a scarce resource. Currently, television channels are each allotted 6 MHz of bandwidth in which to broadcast.<sup>82</sup> HDTV signals will require additional spectrum because they must transmit more electronic information to produce a sharper image. Thus the FCC, which has jurisdiction over broadcast licensees and is charged with managing the spectrum, must choose a transmission standard for HDTV broadcasts that overcomes the problem of spectrum scarcity. The FCC has established an Advisory Committee on Advanced Television Service to coordinate the task.<sup>83</sup>

### B. *Policy Considerations*

Given spectrum constraints, an HDTV transmission standard must be selected with high picture quality and compatibility with non-HDTV signals in mind. Quality and compatibility considerations are important to a young HDTV broadcasting sector because they will effect the ability of local broadcasters to compete with cable, direct broadcast satellite, and VCRs for the HDTV viewing audience. From a quality standpoint, local broadcasts will be compromised due to the aforementioned spectrum scarcity. The other media are free of spectrum constraints and may seek to attain the highest quality audio and video technologically possible. From a compatibility standpoint, local broadcasters must be afforded a chance to compete when HDTV is first introduced, so that transmission standards should accommodate traditional television broadcasts for consumers who have yet to switch to HDTV. Local broadcasting should not be disadvantaged in the transition to HDTV because it is a

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82. Bandwidth is analogous to lanes on a freeway. Channels cannot be placed too close together or interference will result. Interference is prevented in two ways: stations that use the same channel are separated by a required minimum distance, and stations in the same broadcast area transmitting in the Ultra High Frequency (UHF) band of the spectrum are separated by empty channels. This is why the television channels in a city might be 2, 4, and 7 as opposed to 2, 3, and 4. The empty channels are known as the UHF taboos. See Further Notice, *supra* note 1, at 6529.

83. The Advisory Committee was created in 1987 to study and make recommendations regarding the technical, economic, and public interest problems associated with the introduction of advanced television in the United States. The Advisory Committee is composed of industry leaders and representatives from television broadcast networks and stations, equipment manufacturers, cable systems, and the communications bar. See Further Notice, *supra* note 1, at 6522; Formation of Advisory Committee on Advanced Television Service and Announcement of First Meeting, 52 Fed. Reg. 38,523 (1987).

vital part of the U.S. media structure; "[b]roadcasting in the United States, due largely to this country's great land mass and heterogeneous population, is based on federally fostered principles of localism, which encourage responsiveness to issues of local importance."<sup>84</sup> The FCC should not force a single transmission standard upon all media to ensure balanced competition; rather, it should adopt a technically solid standard which meets the special needs of broadcasting and which allows broadcasters to provide problem-free transmissions on a par with other media. The proper stance for regulators to take can be summarized as follows:

The federal government should support a friendly family of standards to enable competing media—broadcast, cable, satellites—to have as level a playing field as possible in bringing HDTV to American consumers. The federal government should not adopt a single standard for all media industries. The key issue is to promote a standard or friendly family of standards, which promote the greatest number of voices reaching the American people, and maximum US participation in HDTV.<sup>85</sup>

A "family of standards" means a set of standards for competing media that places minimal restrictions on transmission while ensuring that some form of inter-media compatibility is feasible.

1. *Quality Concerns.* The issue of quality is of major importance to cable and satellite companies who do not want a standard forced upon them which will inhibit their ability to offer a high-quality transmission. The issue is somewhat more complex for cable companies, because over half of U.S. households receive broadcast programming through cable transmission.<sup>86</sup> The National Cable Television Association expressed its position this way:

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84. *ATV and the National Interest*, *supra* note 4, at 28.

85. PUBLIC POLICY IMPLICATIONS, *supra* note 22, at 310 (Action Memo by Hugh Donahue, MIT).

86. *Id.* at 699 (statement of National Cable Television Association).

The increasing penetration of cable as a video medium has been recognized as a threat to local broadcasting, regardless of any advantage cable operators might gain from HDTV. Because cable companies and local broadcast stations compete with each other for advertising revenues, there is economic incentive for cable systems to terminate retransmission of local broadcast signals. Legislation, passed in the Senate, would amend the Communications Act of 1934 to ensure carriage on cable television of local news and other programming. See S. 12, 102d Cong., 1st Sess. (1991). But cf. Harry Bloch & Michael D. Wirth, *The Broadcasters: The Future Role of Local Stations and the Three Networks*, in VIDEO MEDIA COMPETITION: REGULATION, ECONOMICS, AND TECHNOLOGY 121, 122 (Eli M. Noam ed., 1985):

The impact of competition from cable . . . on television station and television network audiences . . . does not necessarily mean that any stations or networks will be driven out of business. In fact, increased competition on the information/entertainment side of the video marketplace may not even cause a decrease in their profitability, because cable . . .

[a]part from their role as conduits for the delivery of broadcast signals, cable and other media have certain characteristics and capabilities that may enable them to provide unique HDTV services. . . . Thus, while standardization may be necessary for broadcast transmission of HDTV, alternative video distribution media should be left free to maximize their particular technical capabilities in the marketplace.<sup>87</sup>

The Satellite Broadcasting & Communications Association of America formulated its stance in free-market terms, stating that "the market should be as free from standardization as possible, to allow the consumers to be the ultimate decision makers."<sup>88</sup> While such an argument is appealing, it ignores the unique role of local broadcasting in our media structure, which is to provide free programming with attention to localized concerns. A frightening scenario appears when one imagines this country without local broadcasters: centralized programming from cable networks that lack any incentive to inform viewers on issues of local importance or to respond to local needs. The erosion of community and the democratic process would begin at the level of city and town government in much the same way as it would if an area's voters were forced to rely on USA Today for all their information. Taking this vision to an extreme, it would be far easier for a desperate federal government to disseminate propaganda over a centralized mass medium than to force thousands of local broadcasters to air its message. Adoption of a single transmission standard based on terrestrial broadcasting's quality limitations would unnecessarily interfere with the quality offered by competing media, but completely rejecting any degree of standardization for alternate media is not in the overall best interests of the consumer. Picture quality is important to the consumer, but it is not so important that it should be a reason to jeopardize the status of local broadcasting in this country.

2. *Transitional Compatibility Problems and Solutions.* For consumers, the transition from conventional television to HDTV is likely to involve a substantial investment in a new receiver; at the outset of HDTV market penetration, a single set will probably cost between \$2,500 and \$4,000.<sup>89</sup> A majority of consumers will be forced to wait until prices drop before HDTV becomes affordable. Transition will be gradual, so

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[does] not provide meaningful competition for television broadcasters on the *advertising* side of the video marketplace . . . at this time.

87. PUBLIC POLICY IMPLICATIONS, *supra* note 22, at 699-700 (statement of National Cable Television Association).

88. *Id.* at 788 (report of Satellite Broadcasting & Communications Association of America).

89. The Electronic Industries Association predicts the initial average price of an HDTV set will

transmission standards must be designed to accommodate traditional television signals as well as HDTV signals.<sup>90</sup> The FCC's search for a suitable transmission standard was formalized in a Notice of Inquiry released in August of 1987.<sup>91</sup> The purpose of the Inquiry was to acquire information that would help the FCC better understand the advantages and disadvantages of various ATV broadcast options.<sup>92</sup> Three fundamental approaches to implementation emerged from the proposals considered by the FCC.

The first approach merely involves trying to get higher quality out of the existing NTSC broadcast standard, and is known as enhanced definition television (EDTV).<sup>93</sup> Advocates of an EDTV system have been quick to emphasize that such a system would be a low-cost alternative to true HDTV, that it requires no more bandwidth than the 6 MHz presently allotted each channel, and that it is completely compatible with the NTSC system.<sup>94</sup> The FCC would not have to significantly alter the present NTSC standard in order to implement EDTV, because the increase in quality would result from the way transmitters and receivers process signals, not from any fundamental difference in the signal itself. Broad-

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be \$2,500. EIA Report, *supra* note 11, at 49. The American Electronics Association, however, predicts that early units will sell for about \$4,000. AEA Report, *supra* note 10, at 2-4.

90. Since 1941, television receivers have been based on standards developed by the National Television System Committee (NTSC) and adopted by the FCC. The NTSC standard specifies 6 MHz of bandwidth per channel, and has remained essentially unchanged since its inception. Because the NTSC standard reflects the technological limitations of the early days of broadcast television, it is seen as somewhat of a relic today. See Notice of Inquiry, *supra* note 51.

91. *Id.*

92. *Id.* at 5126.

93. See *supra* note 1.

94. A leading EDTV format was developed by Yves Faroudja and Faroudja Laboratories, and is known by the trademark "SuperNTSC". See Donahue, *supra* note 4, at 30, 34. The basic idea behind SuperNTSC is to mimic HDTV quality by using filters in transmission equipment to prevent light and color signals from interfering with each other, and by using digital memory in receivers to store a frame and then interlace it between the horizontal lines of the next frame (thus doubling the number of horizontal lines). See PUBLIC POLICY IMPLICATIONS, *supra* note 22, at 454-55 (overview of SuperNTSC provided by Faroudja Laboratories, Jan. 3, 1989); Further Notice, *supra* note 1, at 6524. For consumers, the expected cost of a SuperNTSC receiver will be about 20 percent greater than the cost of a conventional receiver, making the system economically attractive. Hans Fantel, *Bringing the Television Image Into Focus*, N.Y. TIMES, Jan. 8, 1989, § 2, at 8.

Another leading EDTV system was developed by the David Sarnoff Research Center under sponsorship from the National Broadcasting Corporation, Philips Consumer Electronics, and Thomson Consumer Electronics, Inc. The system, dubbed "Advanced Compatible Television," was the first system to be tested at the FCC's Advanced Television Test Center in Alexandria, Virginia. See Jim Carnes, *How We Fared in the HDTV Testing Process*, ELECTRONIC MEDIA, Oct. 14, 1991, at 20; *First Advanced Television System Moves into ATTC Test Facility*, PR NEWSWIRE, June 25, 1991, available in LEXIS, Nexis Library, Pnews File.

casters, who fear steep costs will be involved if they must upgrade their equipment to deliver true HDTV, have come out in favor of EDTV.<sup>95</sup> Critics of EDTV, however, charge that it is technologically inferior to HDTV and that it will only delay the inevitable transition to true HDTV. FCC Chairman Alfred Sikes has called EDTV a "technological mouse,"<sup>96</sup> and William Schreiber, director of MIT's Advanced Television Research Program, remarked that "[n]othing would be more expensive than a failed venture into EDTV."<sup>97</sup> Indeed, broadcasters and consumers would both be forced to make two investments in new equipment if EDTV is used as a stepping stone toward the introduction of HDTV, and thus EDTV is not as economical as it appears. The FCC should be far-sighted in its solution to the transmission problem, and thus it should decline to embrace an EDTV scheme.

Another approach to delivering higher quality television over the airwaves is known as "augmentation." Augmentation involves transmitting the 6 MHz NTSC signal over one channel while also transmitting a complementary signal over another channel that is currently left open to avoid interference.<sup>98</sup> The complementary signal could carry information needed to generate a wider, clearer picture and digital sound. An augmentation system developed by the National Broadcasting Company, the David Sarnoff Research Center, and Thomson Consumer Electronics, Inc. uses an evolutionary approach culminating in a 12 MHz HDTV signal sent over an existing channel and an adjacent, empty channel.<sup>99</sup> The evolutionary system was designed with speedy consumer acceptance in mind.<sup>100</sup> Other augmentation systems that would only require an additional 3 MHz of spectrum not necessarily adjacent to the existing chan-

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95. The cost of upgrading a terrestrial broadcaster's NTSC equipment to HDTV capability could fall between \$7.4 million and \$40 million. See *THE BIG PICTURE*, *supra* note 31, at 21. The National Association of Public Television Stations expressed its justifiable concern that public television, which relies heavily on federal funding, may not be able to afford an upgrade to HDTV given that "the total cost [of \$3 billion for approximately 300 public stations] would nearly equal all of the federal government's expenditures over the last 20 years." *PUBLIC POLICY IMPLICATIONS*, *supra* note 22, at 624.

96. Peter Lambert, *HDTV Spectrum: "Use It or Lose It"*, *BROADCASTING*, Nov. 11, 1991 at 14.

97. William F. Schreiber, *Thinking the Unthinkable: A Commentary on High-Definition Television*, *BROADCASTING*, July 11, 1988, at 32.

98. See Further Notice, *supra* note 1, at 6531; see also *supra* note 82.

99. See Further Notice, *supra* note 1, at 6524; Donahue, *supra* note 4, at 30, 36.

100. For an account of the policy viewpoints that are touted by the developers, see NATIONAL BROADCASTING COMPANY, INC. ET AL., *ADVANCED TELEVISION IN THE UNITED STATES: A REPORT TO THE HOUSE SUBCOMM. ON TELECOMMUNICATIONS AND FINANCE OF THE COMM. ON ENERGY AND COMMERCE* (1989), reprinted in *PUBLIC POLICY IMPLICATIONS*, *supra* note 22, at 625-94.

nel have been proposed.<sup>101</sup> A major drawback associated with augmentation systems is that although they are able to provide true HDTV in a way that is compatible with NTSC, they do so in an inefficient manner because they rely on the outmoded 6 Mhz NTSC signal; at no time can the NTSC standard be discarded under an augmentation approach.

The third means by which HDTV transmission may be accomplished is by simulcasting. A television station would broadcast programming via the 6 MHz NTSC signal on one channel and an independent 6 MHz HDTV signal on another. The key to this approach is the ability to fit a complete HDTV signal into 6 MHz of bandwidth. Zenith Electronics Corporation has developed a 6 MHz HDTV signal that is completely nonreliant on the NTSC format.<sup>102</sup> Initially, the simulcast path to HDTV transmission would encounter the same spectrum constraints that an augmentation approach would face, but eventually it would allow for the complete phase-out of the old NTSC standard. Consumers could upgrade to HDTV receivers when they become affordable.

### C. *The Future Direction of Policy*

The FCC has decided to give viewers a choice between conventional television and HDTV by adopting a simulcast HDTV standard. In August of 1990, the Commission finalized several policy decisions to narrow the scope of the transmission standard debate, with the most important decision being to adhere to a simulcast system for HDTV.<sup>103</sup> Augmentation was ruled out as an option because it would be less spectrum efficient and more difficult to implement than a simulcast system.<sup>104</sup> The Com-

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101. North American Philips and the New York Institute of Technology have developed 6+3 augmentation systems. See Further Notice, *supra* note 1, at 6525.

102. The Zenith system would pack the HDTV signal into 6 MHz of bandwidth by using a combination digital-analog hybrid signal. See Donahue, *supra* note 4, at 38.

103. *Id.* See *In re Advanced Television Systems and Their Impact on the Existing Broadcast Service*, 5 F.C.C.R. 5627 (1990) (First Report and Order) [hereinafter First Report and Order].

104. In the words of the FCC,

We do not find it useful to give further consideration to systems that use additional spectrum to "augment" an existing 6 MHz television channel to provide NTSC compatible service. While we recognize that an augmentation system could provide improvements in service quality over that of the NTSC system, such a system would be less spectrum efficient and more difficult to implement than a 6 simulcast MHz design. As MIT observes, a simulcast system ultimately will allow the NTSC and HDTV channels to be used independently. The augmentation systems before us do not appear to offer improvements in the quality of television service equal to or greater than could be provided by a 6 MHz simulcast system. This is because their operational designs are con-

mission did not rule out the selection of an EDTV system if one emerged that could "provide quality comparable to that of an HDTV system and be more cost effective for both broadcasters and consumers,"<sup>105</sup> but recent posturing by the FCC indicates the chances of an EDTV system being adopted are slim.<sup>106</sup>

By selecting a simulcast strategy rather than an augmentation strategy, the FCC divorces HDTV technology from conventional technology, which will prevent the old standard from becoming "a millstone around the necks of today's broadcasters."<sup>107</sup> Simulcasting will not only allow consumers a choice, it will also provide better quality than the augmentation approach. Further testing is necessary, but the FCC hopes to have simulcast standards in place in 1993.<sup>108</sup>

The decision by the FCC to adopt a simulcast standard will help local broadcasters to compete with the other media, and that will help HDTV to gain acceptance in the United States and cause the HDTV market to grow accordingly. Although the federal government is reluctant to set a single standard that would affect cable and direct broadcast satellite, it should act to promote a friendly family of standards among the media. Specifically, the FCC should require minimal standardization for alternative media only to the extent that ensures that their signals can be processed by open-architecture receivers.<sup>109</sup> A family of standards

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strained by the technical limitations inherent in the NTSC system. Thus, it does not appear that there would be any gain in service from using the additional spectrum.

*Id.* at 5628.

105. *Id.* at 5629.

106. The FCC emphasized that it did not expect to select an EDTV standard prior to a decision on an HDTV standard, if at all. *Id.* at 5629. FCC Chairman Alfred Sikes commented that the simulcast HDTV option has "greater public interest promise" than does EDTV. Randall M. Sukow & Harry A. Jessell, *Slim Chance for EDTV Appears to Get Slimmer*, BROADCASTING, Sept. 10, 1990, at 26. The skeptical stance of the FCC may have prompted Faroudja Laboratories to withdraw its SuperNTSC system from the FCC testing process. Faroudja failed to submit a testing fee of \$87,500 before it was due. *See id.* at 26.

107. Schreiber, *supra* note 97, at 32. The FCC avoided alarming television broadcasters and consumers by not declaring that the current NTSC would someday be eliminated when it published its decision to pursue a simulcast transmission standard. Nevertheless, statements such as "simulcast systems are not constrained by the limitations inherent in the NTSC technology" and "a simulcast system ultimately will allow the NTSC and HDTV channels to be used independently" infer that the FCC is pointing toward the day when the NTSC standard may be discarded. *See First Report and Order, supra* note 103, at 5628.

108. *See Jay Mallin, FCC Begins Testing to Pick New U.S. TV System*, WASH. TIMES, July 15, 1991, at B5.

109. The open-architecture receiver is currently under development at MIT. Its sophisticated circuitry permits it to handle multiple standards, and to be easily upgraded using hardware or software. *See PUBLIC POLICY IMPLICATIONS, supra* note 22, at 569 (Action Memo submitted by the Media Laboratory at MIT).

based on open-architecture receivers will produce greater economic benefits than a single standard imposed on all media.<sup>110</sup> Moreover, broadcasters will still be able to compete, and there will be room for advances in technology specific to each particular medium.

The FCC, through its Advanced Television Service Committee, is coordinating tests for various transmission standards. By eliminating augmentation standards from consideration, the FCC has moved a step closer to adopting a transmission standard for terrestrial broadcasts. Broadcasters need a standard that permits them to provide quality transmissions that can compete with cable and direct broadcast satellite, but at the same time does not force them to suddenly abandon the old standard compatible with conventional receivers. The FCC must now examine the function of open-architecture receivers as they relate to transmission standards, so that a set of completely incompatible standards does not emerge for media transmissions not currently regulated by the FCC. Preservation of local broadcasting can be accomplished without sacrificing quality and technological innovation.

## VI. CONCLUSION

The U.S. government can no longer rely on private market forces to buoy American innovation and competitiveness in the world marketplace. Countries such as Japan and Germany have recognized that high-technology industries will be vital to their future economic health, and governmental actions in those countries have reflected this. The Japanese have been especially determined to corner high-technology markets through protectionist trade practices and heavy government funding for cooperative ventures. The Bush administration continues to follow a course of laissez-faire economics with strict antitrust regulation while our competitors do just the opposite with far greater success.

This country must begin to realize that the playing field will never be even. Our responsibility now is to ensure an environment that fosters long-term investments for all domestic industries. As a nation, we must decide which industries are vital to our continued well-being and growth, and we must proclaim to our competitors that we are in these industries, and we are going to stay. No company can make this statement, only a country can.<sup>111</sup>

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110. Open-architecture receivers require more hardware and software than receivers designed to accept a single transmission standard, and thus would create a greater demand for related technologies. See PUBLIC POLICY IMPLICATIONS, *supra* note 22, at 312 (Action Memo by Hugh Donahue, MIT).

111. 135 CONG. REC. H1816 (daily ed. May 10, 1989) (statement of Rep. Lipinski).



The HDTV industry is one industry where we can and must make a stand. If legislation to promote cooperative ventures and provide research funding for HDTV is seen as too radical a departure from traditional ideals, the federal government should at least refrain from harming domestic companies that are struggling to compete with huge, well-funded foreign companies by selecting standards better suited for our competitors' systems. The Japanese NHK production standard will be outdated soon, and there is no compelling reason the United States should adopt it while the Europeans refuse to. It is in the best interests of the United States, with its large domestic HDTV market, to formulate its own standard. The FCC should adopt transmission standards that further growth within the domestic HDTV industry, but not at the expense of local broadcasting, which is the only free source of video programming and news; a simulcast system will give broadcasters a chance to compete. A single transmission standard for all media is not necessary; all that is needed is a family of standards that will not constrain alternative media. The standards chosen by the federal government will send a message to U.S. companies contemplating entrance into the HDTV industry. The importance of HDTV to U.S. interests should not be ignored, and the importance of technical standards to the development of HDTV in this country demands that standards be wisely chosen.